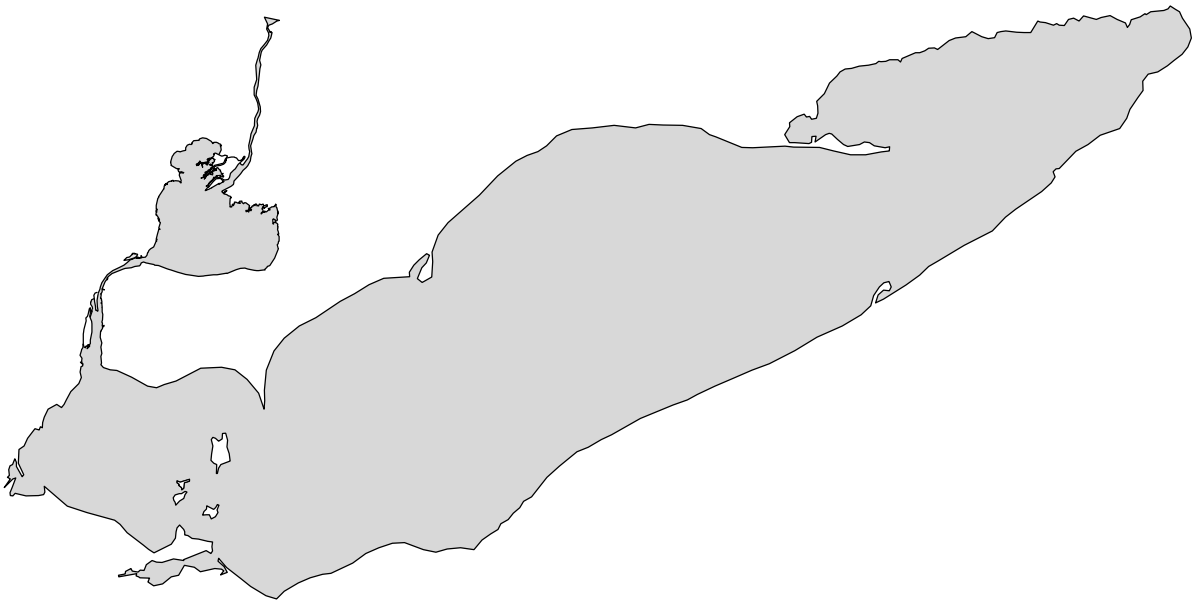
MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION

STATUS OF THE FISHERIES

IN MICHIGAN WATERS OF

LAKE ERIE AND LAKE ST. CLAIR

1997



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Highlights for 1997

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Master Angler program, and commercial fishery records, as well as fisheries research studies. Some of the 1997 highlights described in further detail in this report include:

- Lake Erie yellow perch abundance has increased in recent years, but growth has declined since 1995.
- Lake Erie walleye experienced good reproduction in 1993, 1994, and 1996, but suffered poor reproduction in 1992 and 1995.
- Angler effort for the Lake Erie sport fishery decreased slightly in 1997, remaining well below the levels observed prior to 1991.
- Non-charter catch rates for walleye have remained relatively stable since 1991, while catch rates for yellow perch increased greatly during 1995, 1996, and 1997.
- Lake Erie charter boat catch rates for walleye were over five times higher than those estimated for non-charter anglers in 1997.
- Charter boat yellow perch catch rates for Lake Erie have more than doubled since 1994 and have increased even more dramatically for Lake St. Clair.
- Despite the lack of creel survey data for Lake St. Clair, it is apparent that the muskellunge fishery exceeds that of any other period in modern history.
- A total of 180 lake sturgeon were tagged and released in the Lake St. Clair and the St. Clair River in 1997. No sturgeon tag recoveries have been reported from these waters.

Sport Fishery Summary

An on-site creel survey conducted by the Michigan Department of Natural Resources (MDNR) for Michigan's 1997 Lake Erie sport fishery (non-charter) produced a total harvest estimate of 583,307 fish (Table 1). Estimated angler effort in 1997 decreased slightly from 1996 (Figure 1), and remained well below the high levels of effort observed prior to 1991. We suspect fishing success was not a major contributing factor to the change in effort, since catch rates for walleye have remained relatively stable throughout this time period, and yellow perch catch rates in recent years are the highest for the period (Figure 2). Other factors, including weather, fishing success for other species on other Great Lakes waters, and economic conditions have likely contributed to the decreased level of fishing effort since 1991.

Biological samples were collected from walleye and yellow perch during the 1997 on-site creel survey. Age 3 and 4 fish (1994 and 1993 year classes) dominated the walleye harvest, comprising 73% of the catch (Figure 3). Harvested age 3 walleye averaged 415 mm (16.3 in.) total length. Age 4 fish (1993 year class) averaged 465 mm (18.3 in.) total length. As expected, the extremely weak 1992 and 1995 walleye year classes contributed little to the fishery (5%).

Yellow perch harvest was dominated by age 3 and age 4 fish (1994 and 1993 year-classes), which combined for 80% of the total harvest (Figure 3). Age 2 fish (1995 year class) contributed an additional 15% to the total harvest. Average lengths of harvested age 2, 3, and 4 yellow perch were 182 mm (7.2 in.), 197 mm (7.8 in.), and 217 mm (8.5 in.), respectively. The observed mean length at age for yellow perch taken in the Michigan sport fishery in 1997 declined for all ages (Figure 4). We suspect that an unusually cool spring water temperatures reduced yellow perch growth in Lake Erie in 1997.

Since 1989, Michigan charter boat operators have been required to report their charter fishing catch and effort to the MDNR. In 1997, Michigan charter boat anglers harvested 71,116 fish from Lake Erie (Table 2). Walleye (54%) and yellow perch (44%) were the major species in the charter boat harvest,

accounting for 98% of the catch. While charter boat catch rates for walleye were over five times higher than those estimated for non-charter anglers in 1997, yellow perch catch rates were higher for non-charter anglers.

On Lake St. Clair and the St. Clair River, charter boat anglers harvested 14,553 fish (Table 3). Yellow perch (72%) and "other" species (18%) made up the bulk of the catch, accounting for about 91% of the total harvest. The "other" species category is thought to consist mainly of smallmouth bass and muskellunge. Walleye accounted for about 9% of the 1997 charter boat harvest on Lake St. Clair.

During the period since 1990, walleye catch rates have remained relatively high for Lake Erie charter boat anglers (Figure 5), but declined markedly after 1990 for Lake St. Clair charters (Figure 6). In 1997, the charter catch rate for Lake St. Clair walleye increased slightly, but the number of charter excursions for Lake St. Clair remained about the same (Figure 7). This may be the result of a shift in charter boat angling effort away from walleye toward yellow perch and other species including smallmouth bass and muskellunge.

Charter boat catch rates for yellow perch declined slightly for Lake Erie and remained about he same for Lake St. Clair in 1997 (Figures 5 and 6). Since 1990, yellow perch catch rates for Lake St. Clair charter boats have increased over seven-fold and have improved for Lake Erie as well. Lake St. Clair charter boat catch rates for yellow perch have exceeded that for Lake Erie charter boats for three consecutive years. This is likely a result of improved yellow perch fishing in Lake St. Clair and a shift in charter boat fishing effort to yellow perch.

Despite the lack of creel survey data for Lake St. Clair, it is apparent that the muskellunge fishery exceeds that of any other period in modern history. Angler reports indicate that catch rates in the 1990's are spectacular. Muskellunge catch rates derived from the Angler Diary Program on Lake St. Clair verify these reports (Figure 8). We believe that the quality of the Lake St. Clair muskellunge fishery is also reflected in the MDNR's Master Angler Program. The total number of muskellunge from Lake St. Clair entered for Master Angler Awards in 1997 was the highest since 1986 (Figure 9). The number of fish over 30 pounds equaled the highest mark for the same period. We believe that factors contributing to the dramatic improvement in this fishery include: 1) a positive response to increased minimum size limits on both sides of the lake since the mid-1980's; 2) physical and biological changes in the lake such as clearer water and increased aquatic plant growth resulting in improved habitat for Great Lakes muskellunge; and, 3) increased voluntary catch and release fishing for muskies in Lake St. Clair by both sport and charter anglers.

Commercial Fishery Summary

State licensed commercial seine operations in the shallow embayments along Michigan's Lake Erie shoreline harvested 12 species of fish for a total of 511,765 pounds (Table 4), a 12% decrease from the total harvest of 580,810 pounds in 1996. In combination, common carp (64%), buffalo (18%) and quillback (7%) accounted for 89% of the total harvest by weight. The total value of the 1997 Lake Erie commercial harvest from Michigan waters was estimated at $115,334.

Summary of Netting Surveys

The Michigan waters of the western basin of Lake Erie have been monitored with spring trap net surveys since 1978. In 1997, total catch per net lift (CPUE) for all species combined was the lowest recorded during this period (Table 5). Only smallmouth bass and redhorse suckers exhibited CPUE

values above the 20 year mean CPUE. Yellow perch CPUE was similar to that for the past six years, but remained well below the 20 year mean. Comparison of yellow perch mean CPUE for the 1978-89 period (254.6/lift) with the 1990-97 period (40.1/lift) clearly illustrates the dramatic change in yellow perch catches at the spring trap net sites. This change is likely the result of a substantial decline in yellow perch abundance since 1990. In addition, we also suspect that increased net avoidance due to improved water clarity has contributed to low total CPUE since 1990.

Walleye from the 1994 year class (age 3) accounted for 32% of the trap net walleye catch (Figure 10). The 1993 and 1991 year classes were also well represented, accounting for 22% and 15% of the total catch respectively. Conversely, the weak 1992 year class (age 5) was very poorly represented in the trap net catch in 1997. Based on mean length at age, no trend is evident for Lake Erie walleye growth rates. A total of 1,718 walleye captured in the trap nets were tagged and released as part of the ongoing interagency tagging project.

Age 4 (1993 year class) yellow perch were the most abundant year class in the trap net yellow perch catch, accounting for 32% of the total catch (Figure 11). The 1994 year class (age 3) was nearly as abundant, contributing 26% of the total catch. Age specific catch rates for yellow perch from the trap nets, suggest that these two year classes (1993 and 1994) are the two strongest yellow perch year classes since the late 1980's. Growth for yellow perch of most ages has apparently slowed again, after a period of several years in the early and mid-1990's of improving growth rates (Figure 12). This most recent slow down may be a result of increased yellow perch abundance and competition for food resources, or it may be related to shortened growing seasons due to weather conditions in 1996 and 1997.

Since 1978, the MDNR has fished variable mesh multi-filament gill nets at two locations in western Lake Erie each fall, as part of the interagency yearling walleye assessment program. During 1997, a total of 349 walleye were caught in eight net lifts. The total walleye catch-per-effort for the index sites in 1997 was nearly identical to that for 1996, the second lowest recorded during the 20 year time series (Table 6). The age 1 catch rate of 37.5 suggests that the 1996 year class is at least average. Mean length for age 1 walleye in 1997, 306 mm, was the lowest observed in the 20 year period. This suggests the 1996 year class is growing slowly, perhaps due to weather conditions, and was not fully vulnerable to the index nets due to small size. The very low catch rate for age 2 fish indicates that the 1995 year class is quite weak, similar to the 1992 year class. No trend in walleye growth is obvious from the mean length at age data for walleye taken in the fall index gill net survey.

The fish community of Lake St. Clair was surveyed with bottom trawls in 1997 by the MDNR. Over 200 trawl tows were conducted at locations randomly selected across the lake. The diversity of the Lake St. Clair fish community was obvious during the sampling, with 45 fish species represented among the total of 82,000 fish collected. The three most abundant species, trout-perch, spottail shiner, and mimic shiner, were all forage species, reflecting the rich food supply for predator species present in Lake St. Clair (Figure 13). Yellow perch were the most abundant game fish species, accounting for 10% of the total catch. Round gobies were collected from all areas of the lake, but tubenose gobies remain rather scarce.

A total of 187 lake sturgeon were collected during assessment surveys on the St. Clair River and Lake St. Clair in 1997. All, but one were released back into these waters. One sturgeon, caught in the St. Clair River was donated for live display at the Detroit Zoo's Belle Isle aquarium. Sturgeon captured in 1997 averaged 44.4 inches in total length, with a range from 10 inches to 69 inches. A total of 172 sturgeon were aged with pectoral fin ray sections. Thirty-three year-classes were represented with ages ranging from 1 to 42 years (Figure 14). A total of 180 sturgeon were tagged on the opercle with numbered metal tags and released. If we are able to continue capturing and tagging sufficient numbers of sturgeon, we should gain valuable insight into the population status of sturgeon in Lake St. Clair.

Fish Tagging Studies

In 1997, a total of 6,488 walleye were tagged by Ohio, New York, and Michigan at 8 different Lake Erie sites. A total of 209 of those tags were recovered by fishermen for a single season reporting rate of 3.2%. The 1997 site-specific reporting rate varied from a low of 1.54% at the Evan's Bar site in New York, to a high of 3.8% for the Sugar Rock tag site in Ohio. Other sites with reporting rates over 3.0% were the Ontario Chicken and Hen site (3.3%) and Michigan's Raisin River site (3.4%).

The Livonia District Office conducted a walleye tagging study in the Huron River near Flat Rock from 1992 to 1994. A total of 1,469 walleye were tagged and released during the spring spawning run in the river. Since no walleye were tagged at the site in 1995 or 1996, recoveries of Huron River site fish declined considerably. However, this project continues to produce some interesting results. A comparison of the areal distribution of all tag recoveries from the Huron River and 1997 tag recoveries for the Monroe tag site is shown in Figure 15. It is quite evident that Huron River fish have a stronger tendency than Monroe-tagged fish to move north out of Lake Erie. In fact, since 1992 over 56% of all Huron River site tag returns have come from the Detroit River or waters further north. In comparison, only 21% of the Raisin River site tag returns have come from the Detroit River or northward for the same time period. The contribution of small walleye stocks to the walleye fishery in the Great Lakes waters of southeast Michigan is unclear at this time. However, it is clear from these tagging studies that walleye populations in these waters frequently travel long distances and readily move between the various water bodies. Continued tagging efforts targeting relatively small walleye spawning runs, such as the Huron River run, can provide further insight into their importance.

In 1996, MDNR began a yellow perch tagging study in Lake St. Clair to document yellow perch movements and exploitation. Small monel tags were placed on the lower jaw of 1,717 yellow perch during the spring of 1997, for a total of 3,083 fish tagged since 1996. A total of 96 tags have been reported by anglers through February, 1998. The geographical distribution of the tag recoveries (Figure 16), appears to differ between the two main tag sites. We plan to continue this tagging study for at least three more years to further evaluate movement, exploitation, and mortality rates.

Sport Fishing Regulations

Fisheries biologists with the Ontario Ministry of Natural Resources (OMNR) are concerned about the status of the walleye spawning stock in the Thames River, the major walleye spawning site for Lake St. Clair. Their concerns are based on an apparent decline in spawning success for walleye in the Thames River. As a result, the OMNR implemented a 17 inch maximum size limit (with one fish over 25 inches) for walleye in Ontario waters of Lake St. Clair and the St. Clair River in 1997. This regulation remains in effect indefinitely. The Michigan DNR, however, did not recommend or implement this regulation for the Michigan portion of these water bodies. We believe the extensive movements of walleye throughout this system, combined with uncertainties of changing environmental conditions affecting index survey programs, and no evidence of excessive exploitation, prevent us from recommending such a radical regulation change. Michigan will continue to enforce a 13 inch minimum size limit for these waters. We also recommend no change in the present daily bag limit of six walleye for Lake St. Clair and the St. Clair River.

Walleye in Lake Erie are managed cooperatively with other jurisdictions under a harvest quota system. Michigan's sport fishery has consistently harvested below the quota since 1991. This underutilization of the available resource appears to be mainly a result of reduced fishing effort in Michigan waters. Therefore, the daily walleye bag limit in Michigan's waters of Lake Erie will once again include the statewide 5 fish daily limit and an additional 5 fish, for a total daily limit of 10 fish per day for 1998. If harvest exceeds the harvest quota in the future, the daily bag limit will be adjusted downward.

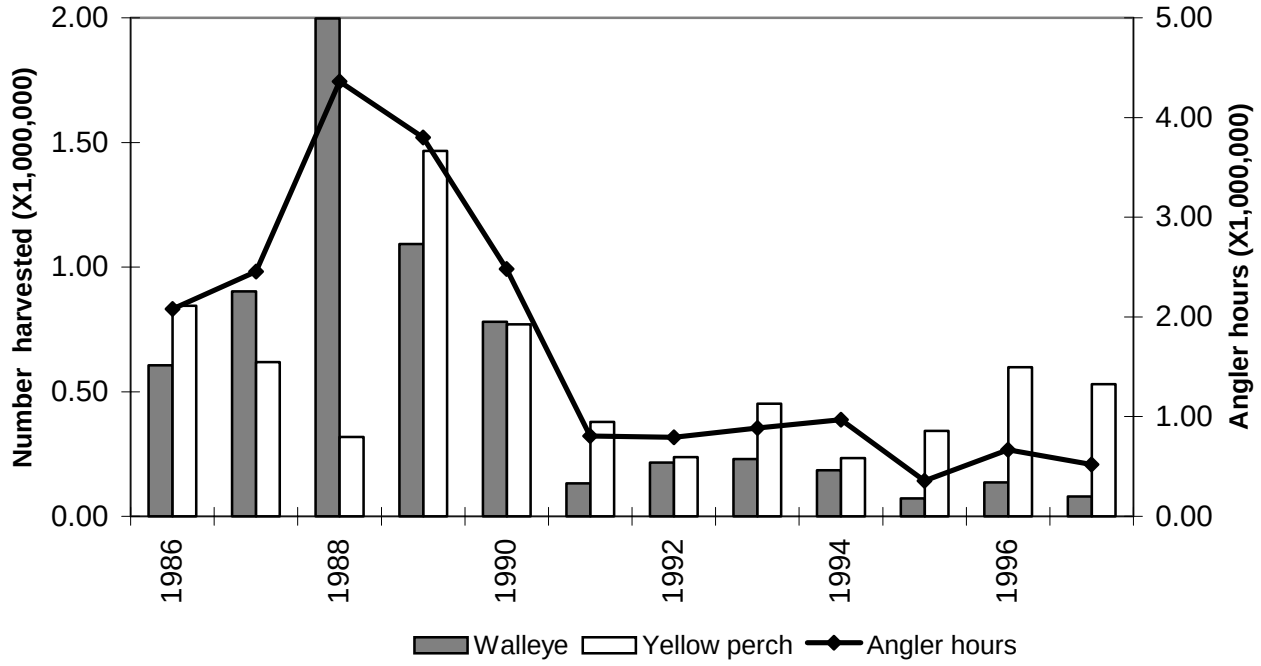


Figure 1.—Estimated harvest and effort for Michigan's Lake Erie sport fishery, 1986-1997.

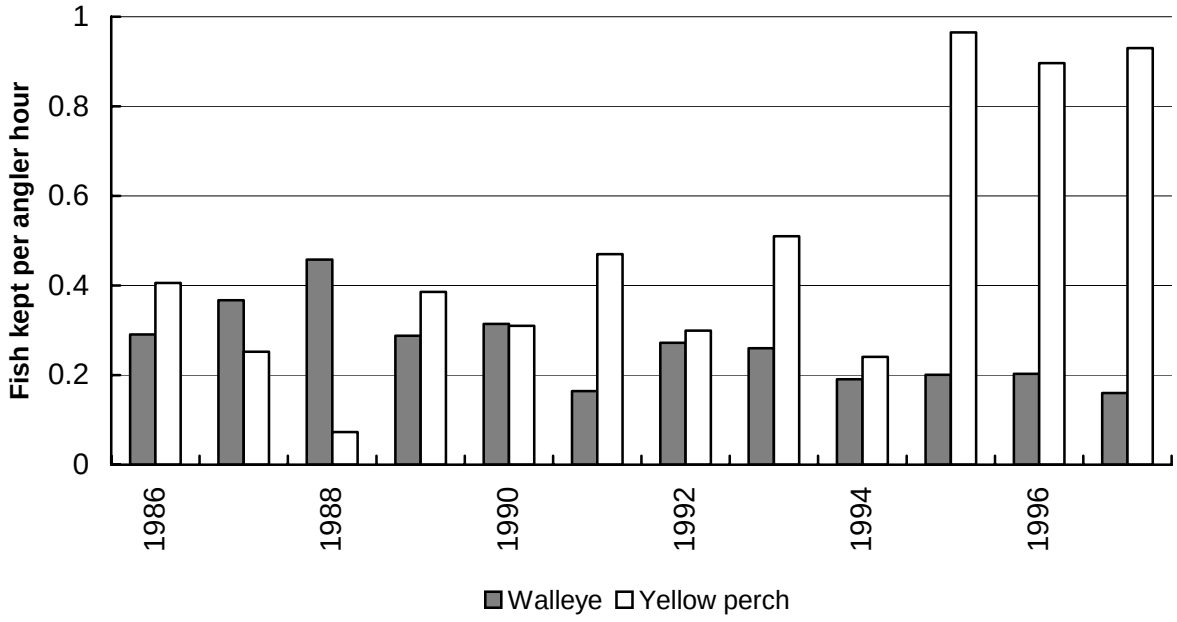


Figure 2.—Walleye and yellow perch catch per effort for Michigan's Lake Erie sport fishery, 1986-1997.

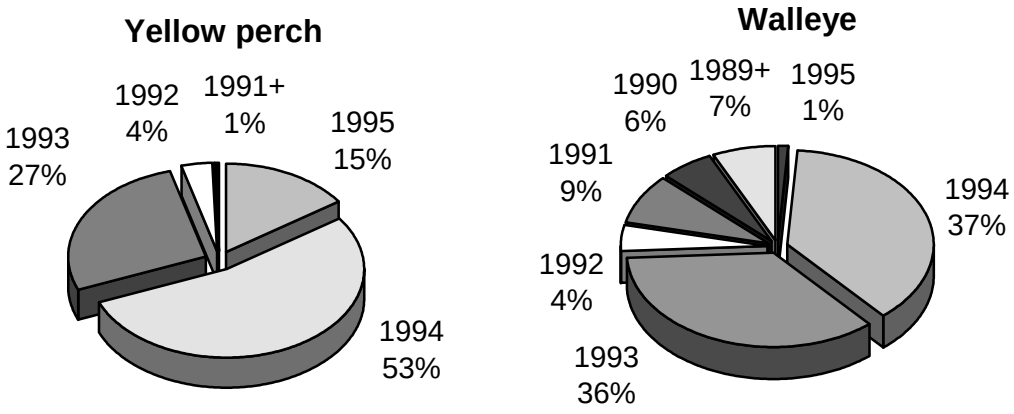


Figure 3. —Year-class contribution to Michigan sport harvest for walleye and yellow perch from Lake Erie in 1997.

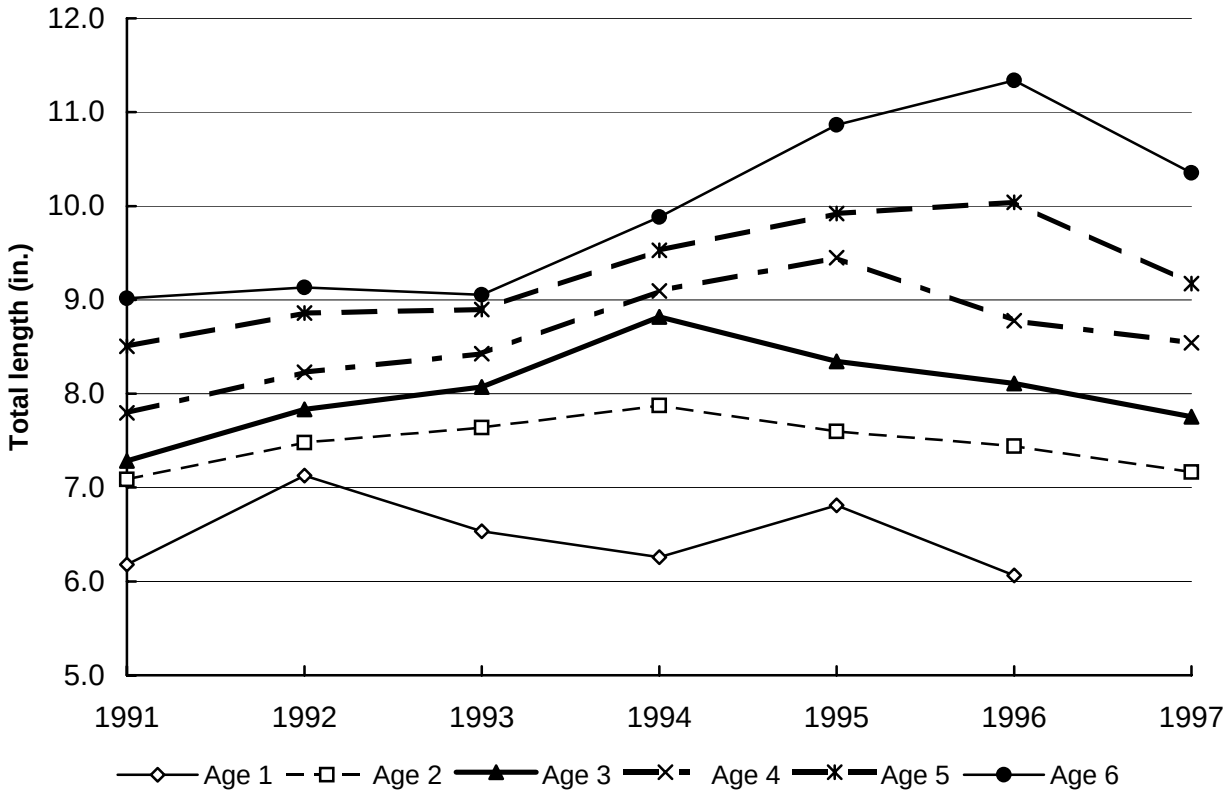


Figure 4. —Mean length at age for sport caught yellow perch from Michigan's waters of Lake Erie, 1991-1997.

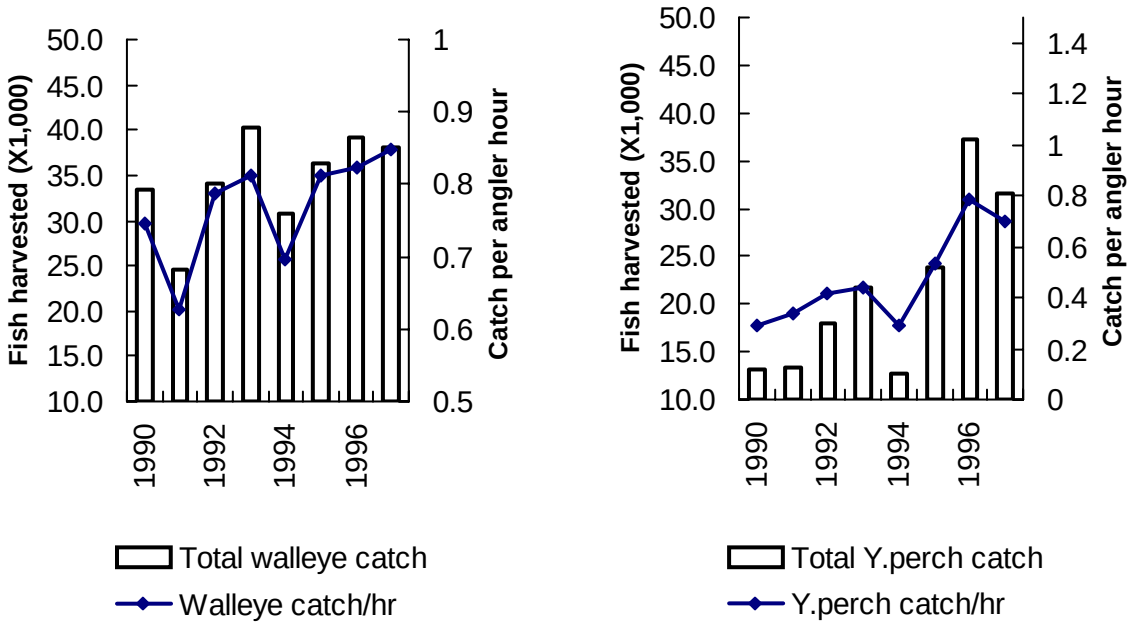


Figure 5. —Michigan charter boat harvest and catch rates for Lake Erie, 1989-1997.

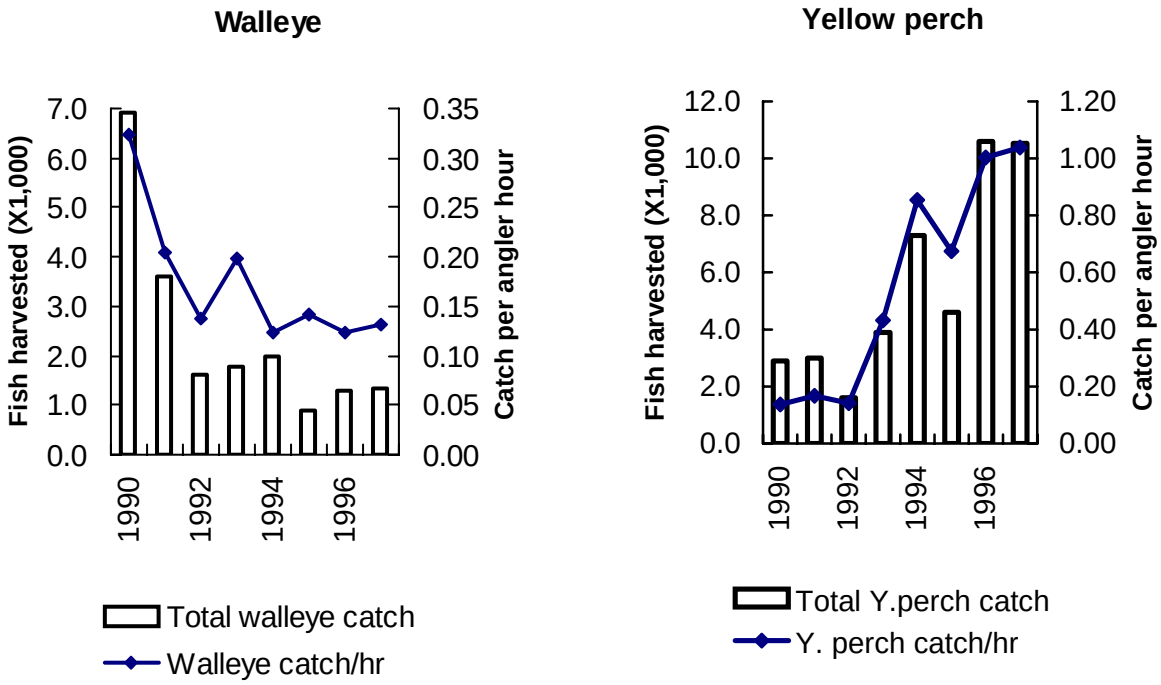


Figure 6. —Michigan charter boat harvest and catch rates for Lake St. Clair, 1989-1997.

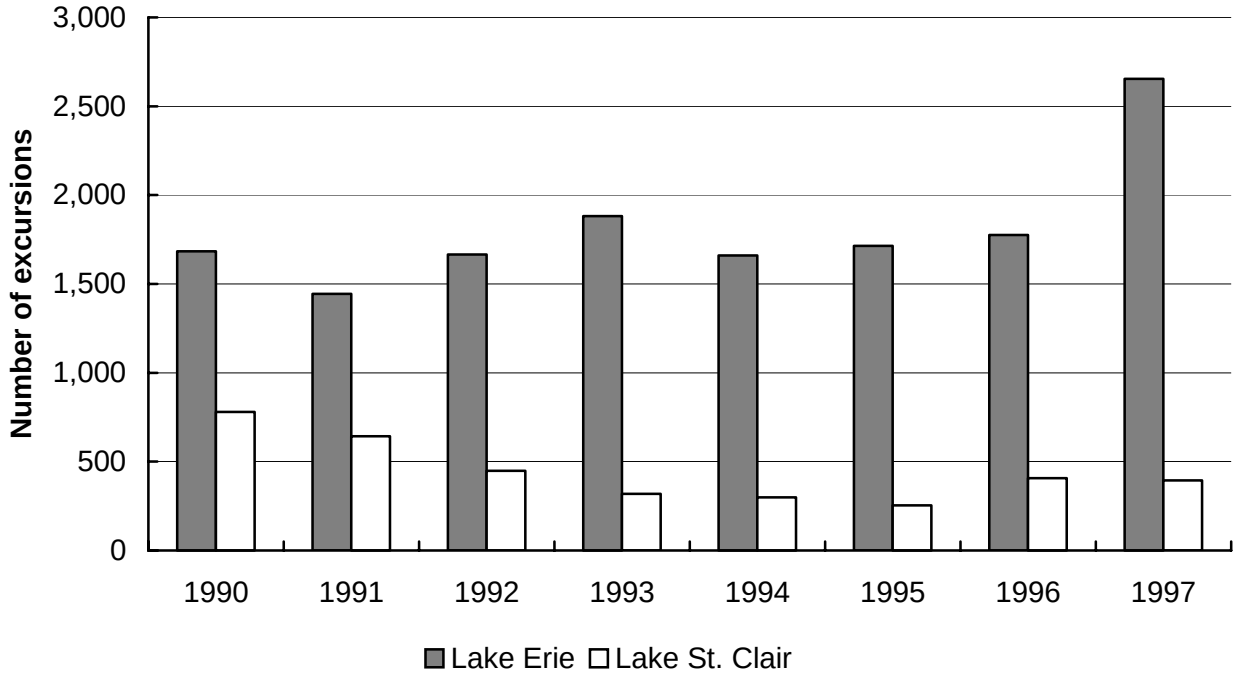


Figure 7. —Reported charter boat excursions on Lake Erie and Lake St. Clair, 1989-97.

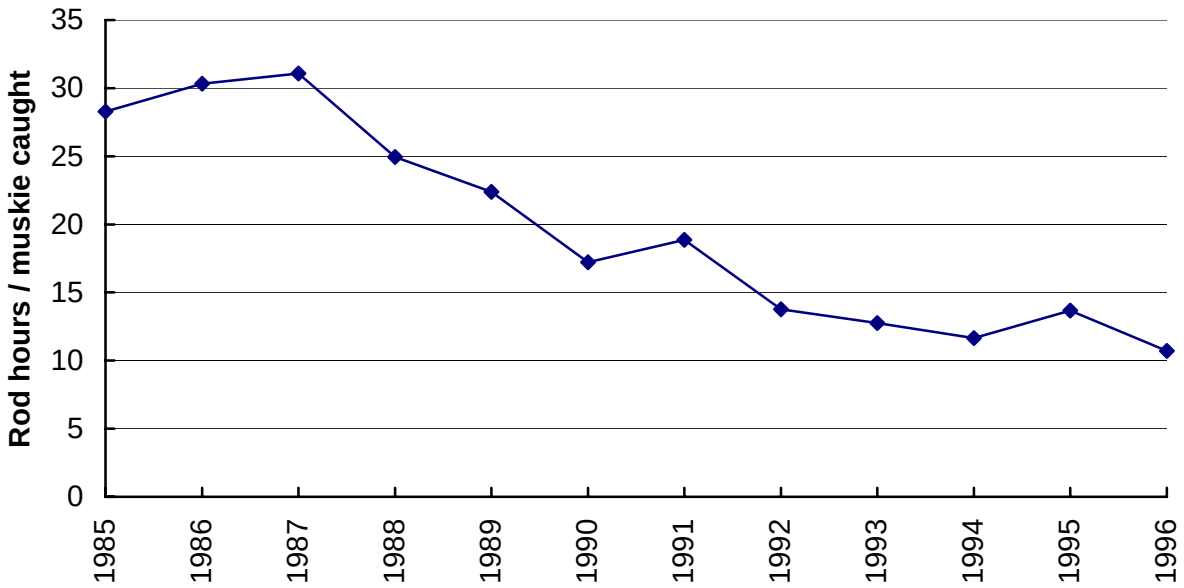


Figure 8. —Lake St. Clair great lakes muskellunge catch rate from Angler Diary Program, 1985-96.

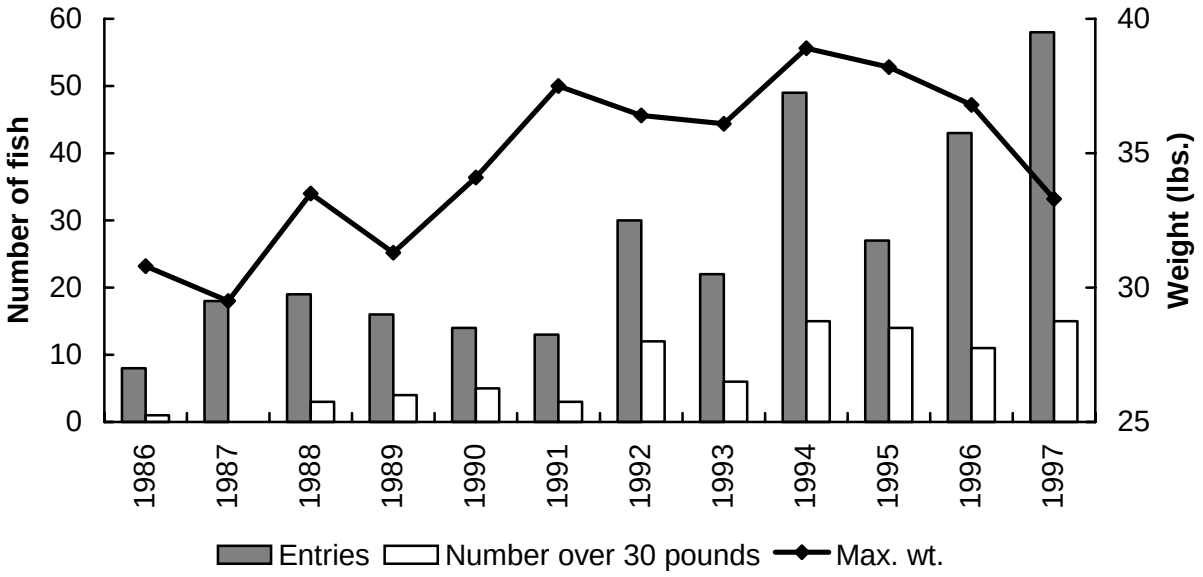


Figure 9. —Lake St. Clair great lakes muskellunge entered in the Michigan DNR Master Angler Program, 1986-1997. Values for 1992-97 represent combined regular and catch-and-release Master Angler categories.

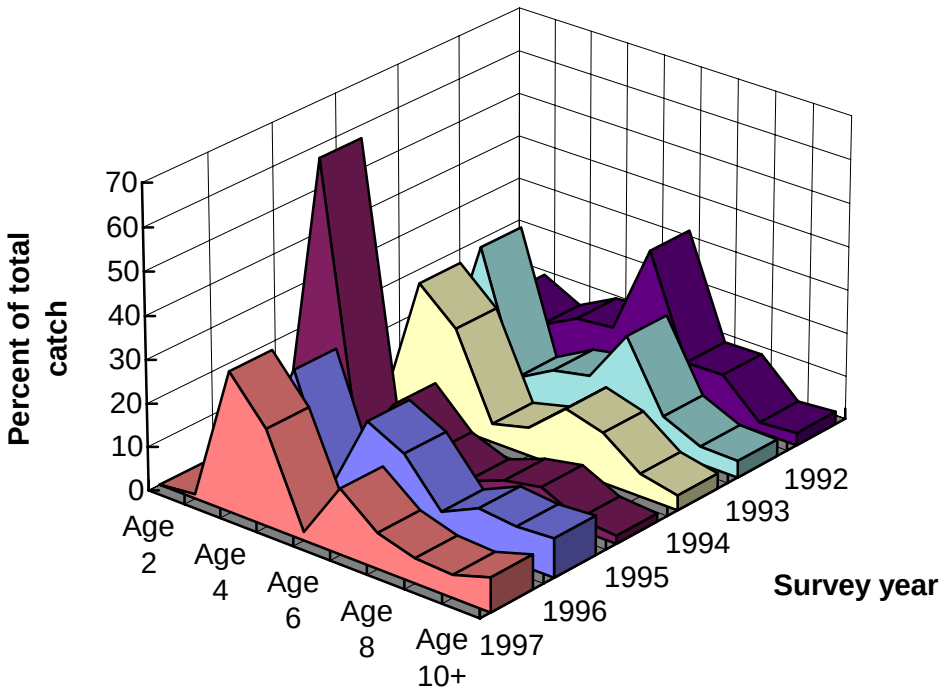


Figure 10. —Age composition of walleye from survey trap nets on Lake Erie, 1992-1997.

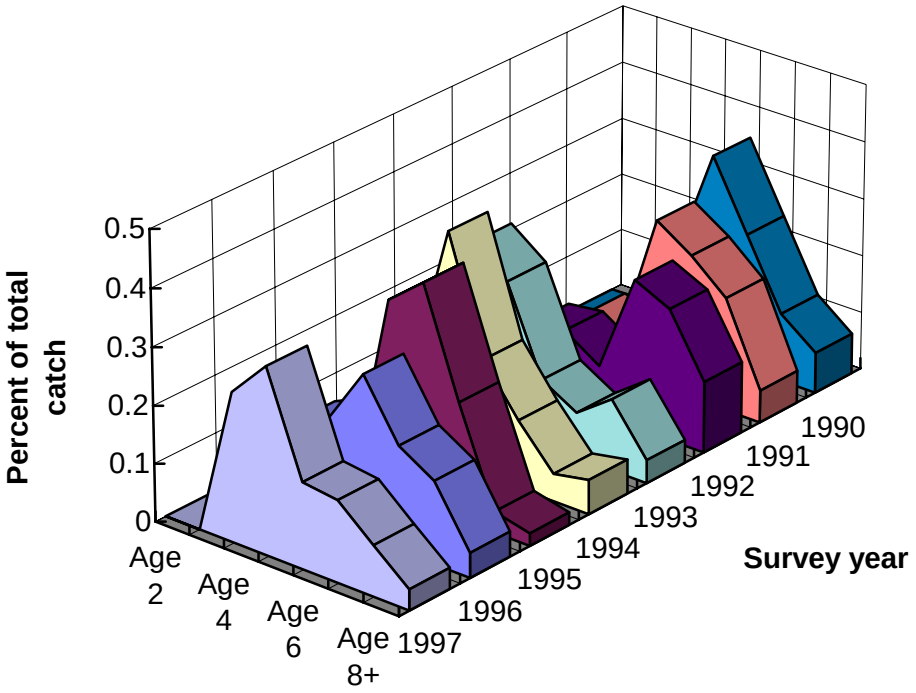


Figure 11. —Age composition of yellow perch from survey trap nets on Lake Erie, 1990-1997.

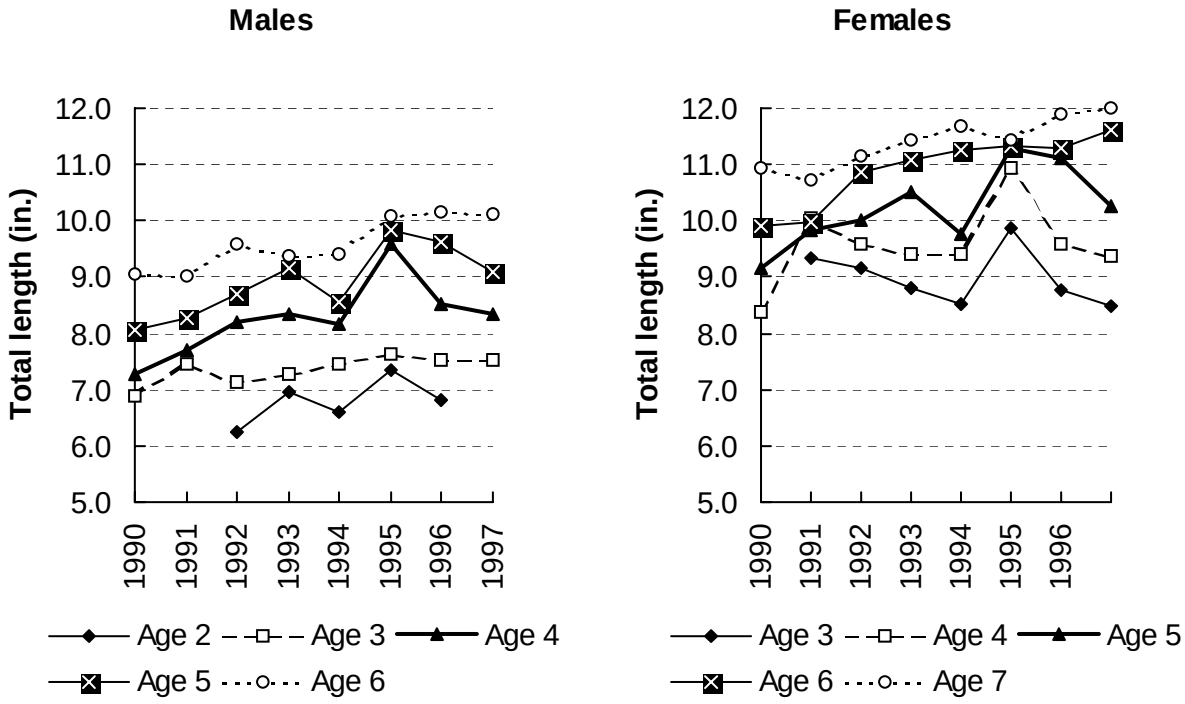


Figure 12. —Mean length-at-age for yellow perch from index trap nets, Lake Erie, 1990-97.

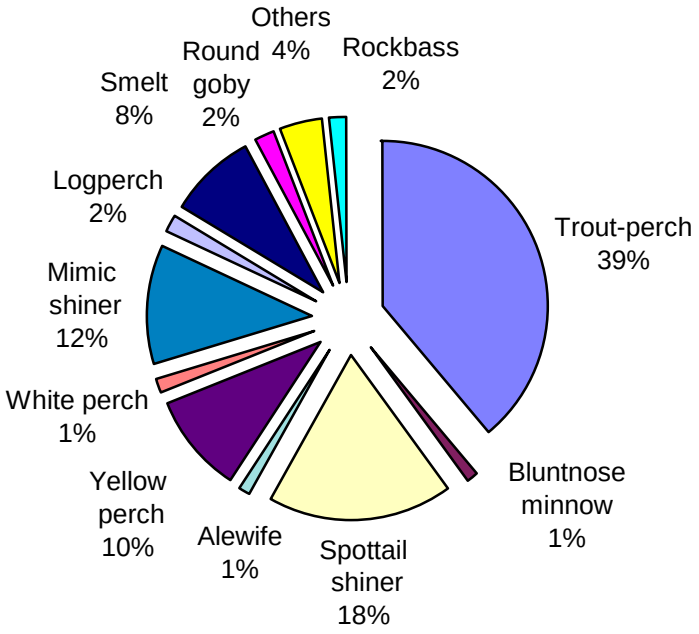


Figure 13. —Catch composition for all trawls on Lake St. Clair in 1997.

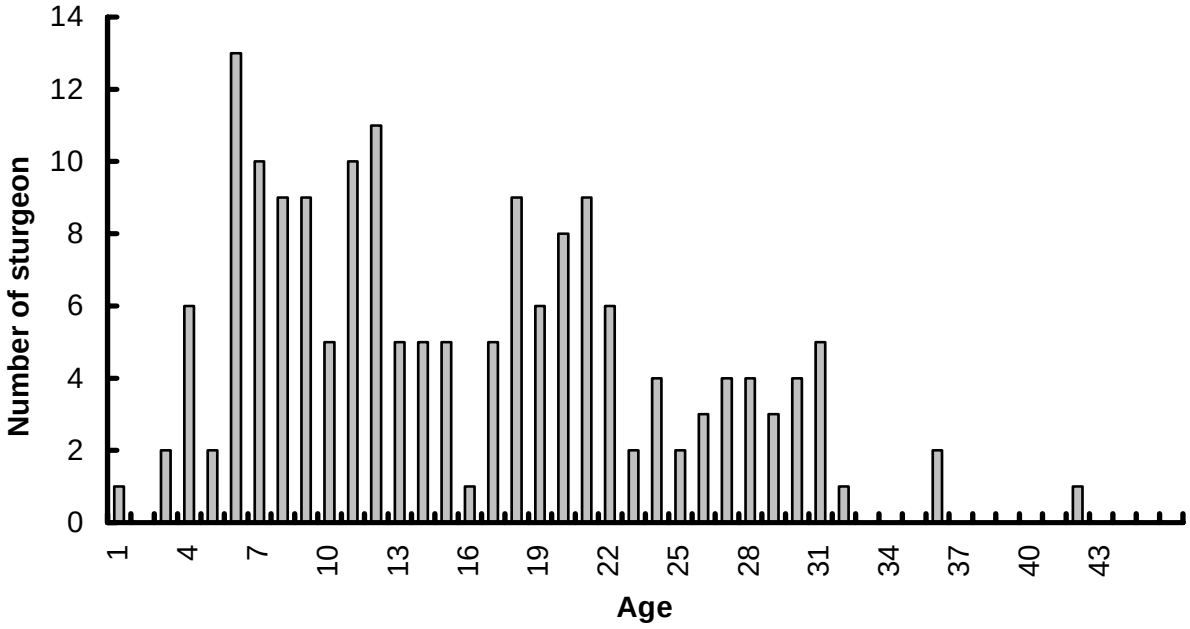
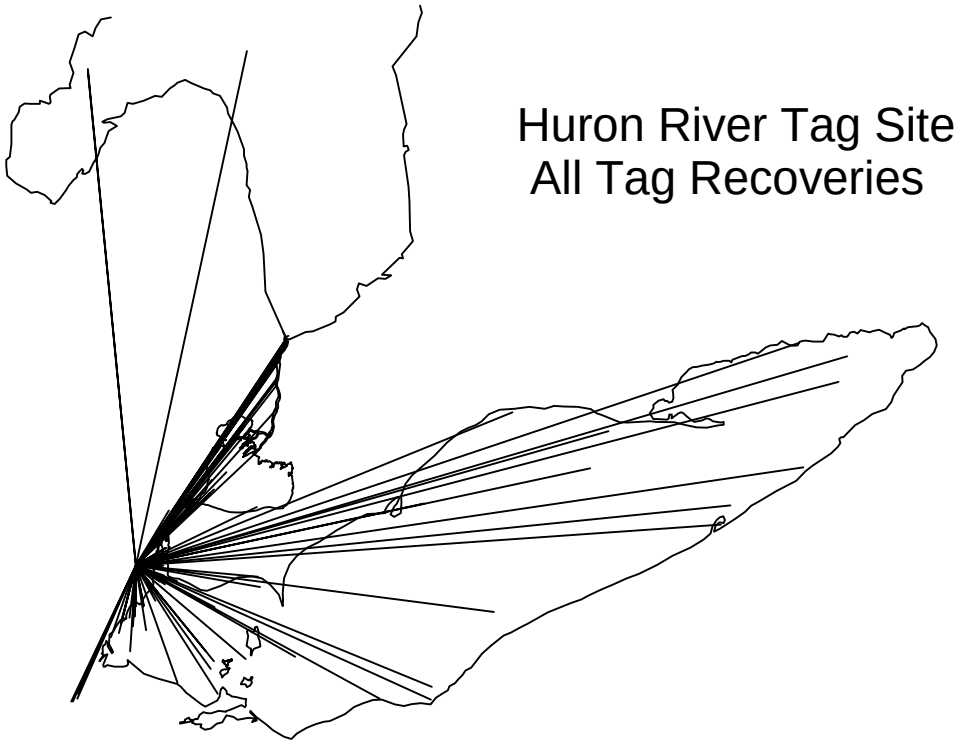


Figure 14. —Age distribution of 172 lake sturgeon sampled from Lake St. Clair and St. Clair River in 1997 by Mt. Clemens Research Station.



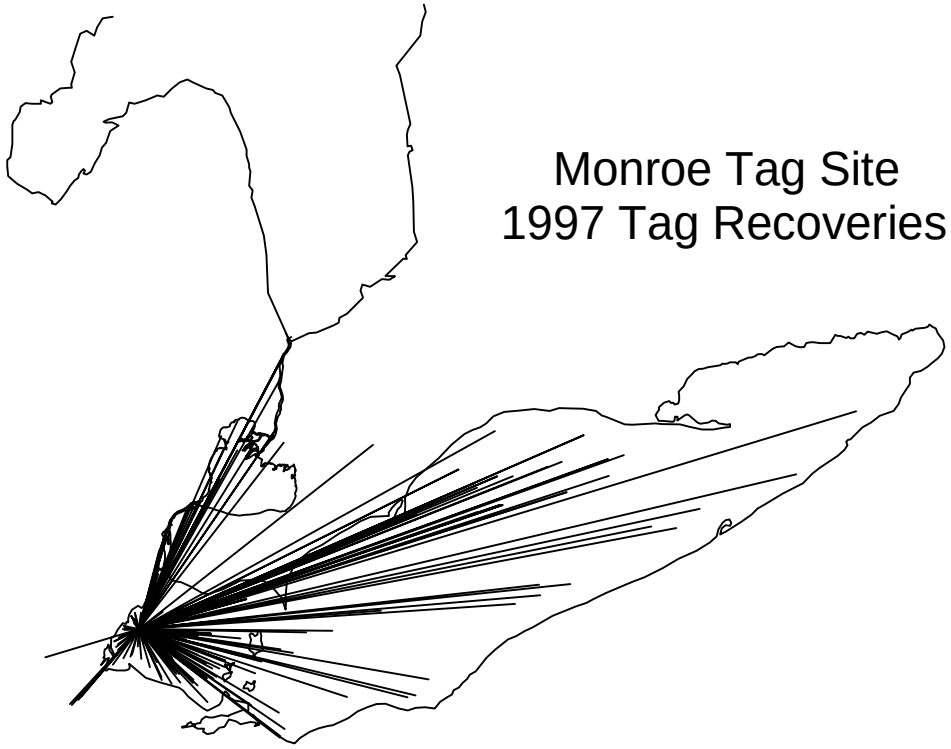


Figure 15. —Geographical distribution of walleye tag recoveries from fish tagged during all years at the Huron River, and during 1997 at the Monroe, Lake Erie tag sites.

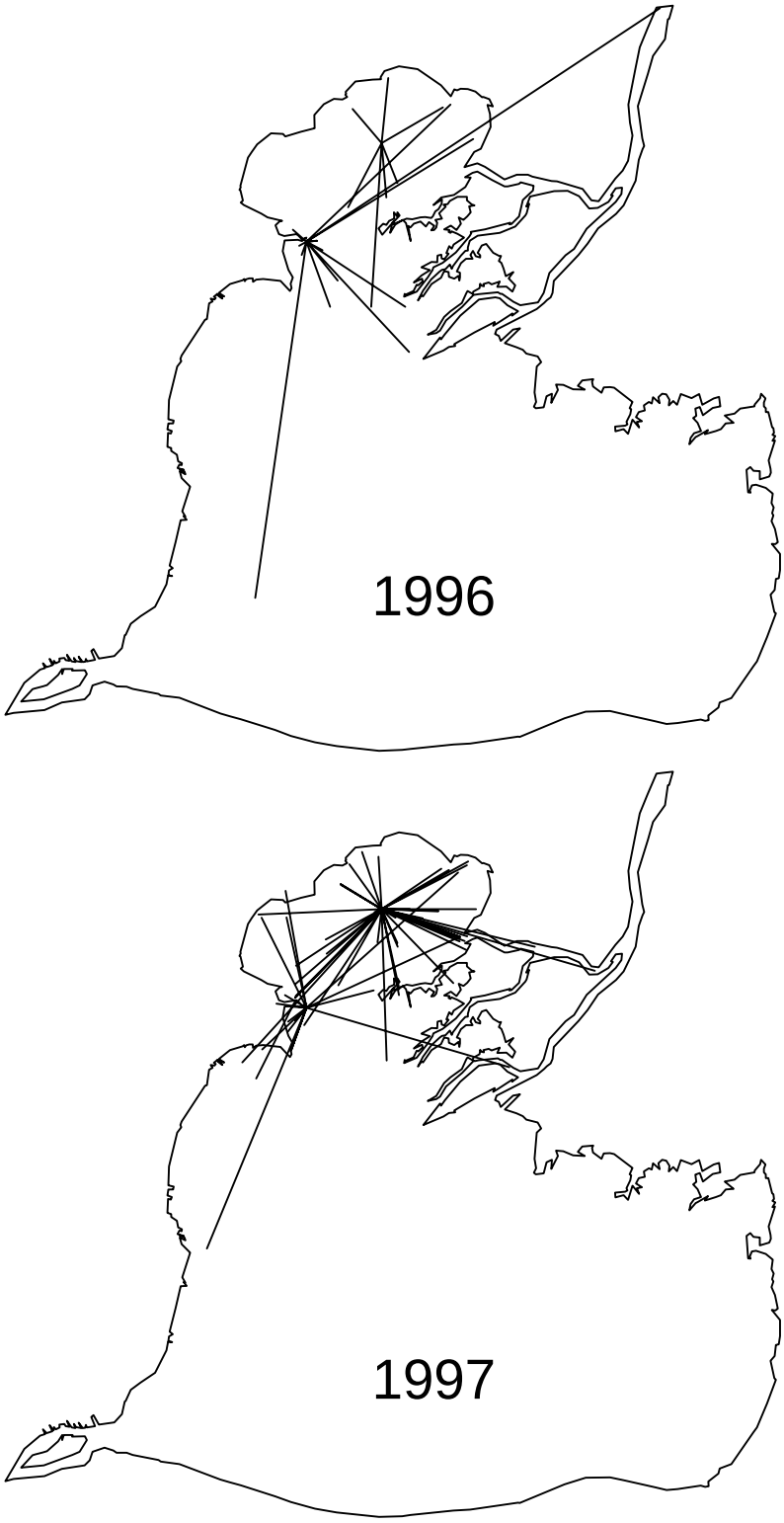


Figure 16. —Geographical distribution of yellow perch tag recoveries from fish tagged during the spring of 1996 and 1997 at the Clinton River and Grassy Island tag sites on Lake St. Clair.

Table 1.-Estimated sport harvest, catch rate, and effort for Michigan's 1997 Lake Erie non-charter boat fishery. Two standard errors in parentheses.

Species	Total C/H	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0 (---)	4 (9)	0 (---)	0 (---)	0 (---)	0 (---)	0 (---)	0 (---)	4 (9)
Chinook salmon	0 (---)	3 (6)	0 (---)	0 (---)	3 (7)	0 (---)	0 (---)	0 (---)	6 (9)
Rainbow trout	0 (---)	0 (---)	12 (20)	7 (11)	4 (9)	0 (---)	0 (---)	0 (---)	23 (25)
S.mouth bass	0.0019 (0.0008)	0 (---)	0 (---)	37 (41)	400 (323)	289 (205)	217 (180)	54 (58)	997 (429)
Yellow perch	0.9546 (0.2609)	0 (---)	991 (543)	4,654 (2,184)	17,192 (20,414)	135,010 (44,060)	294,832 (111,719)	45,266 (19,205)	497,945 (123,341)
Walleye	0.1613 (0.0363)	2,278 (1,989)	6,095 (2,041)	28,271 (11,828)	42,870 (10,664)	4,180 (1,771)	193 (136)	249 (332)	84,136 (16,279)
Lake whitefish	0.0004 (0.0005)	0 (---)	97 (200)	99 (133)	0 (---)	0 (---)	0 (---)	0 (---)	196 (240)
Total	1.1183 (0.2712)	2,285 (1,989)	7,195 (2,122)	33,068 (12,029)	60,469 (23,034)	139,479 (44,096)	295,242 (111,719)	45,569 (19,208)	583,307 (124,412)
Angler hours		12,571 (8,909)	35,755 (11,314)	114,363 (38,982)	160,771 (33,371)	77,350 (20,118)	97,371 (17,826)	23,426 (8,144)	521,607 (60,245)
Angler trips		2,756 (2,033)	6,486 (2,039)	19,695 (6,605)	26,808 (5,556)	15,428 (4,145)	20,600 (3,862)	4,855 (1,681)	96,628 (10,849)
Angler days		2,748 (2,032)	6,457 (2,033)	19,695 (6,605)	26,808 (5,556)	15,412 (4,144)	20,600 (3,862)	4,855 (1,681)	96,575 (10,848)

Table 2. - Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 1997.

Species	Total catch per hour	Total catch per excursion	Month							Season Total
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Walleye	0.8471	22.6770	240	4,079	18,335	14,456	1,149	4	1	38,120
Yellow perch	0.6997	18.7329	17	239	542	810	12,720	16,144	1,018	31,490
Rainbow trout	0.0003	0.0089	0	6	9	1	0	0	0	15
Other	0.0331	0.8870	0	528	637	318	8	0	0	1,491
Angler hours			355	6,917	18,844	12,060	3,740	2,910	176	45,002
Angler trips			65	1,203	3,384	2,164	690	569	42	8,117
Anglers										
Resident			56	979	3,091	1,983	635	541	32	7,317
Nonresident			9	224	293	181	55	28	10	800
Charter excursions			16	253	692	449	149	113	9	1,681

Table 3. - Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake St. Clair and the St. Clair River, 1997

Species	Total catch per hour	Total catch per excursion	Month							Season Total
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Yellow perch	1.0379	26.7234	0	545	2,067	1,390	902	4,437	1,188	10,529
Walleye	0.1321	3.4010	117	143	186	475	372	47	0	1,300
Chinook salmon	0.0062	0.1599	12	47	4	0	0	0	0	63
Cohon salmon	0.0006	0.0152	0	0	0	0	0	6	0	6
Other	0.2617	6.7386	0	3	758	889	572	432	1	2,655
Angler hours			211	726	2,173	2,802	1,998	1,828	407	10,145
Angler trips			47	157	377	425	331	273	72	1,682
Anglers										
Resident			47	157	371	395	302	244	66	1,582
Nonresident			0	0	6	30	29	29	6	100
Charter excursions			12	34	89	103	75	63	18	394

Table 4. - Commercial harvest from Michigan waters of Lake Erie in 1997.

	Carp	Buffalo	Quillback	Gizzard Shad	Channel catfish	Other[1]	Total
Harvest (lbs.)	325,433	91,877	33,937	24,494	17,936	18,088	511,765
% of total	64	18	7	5	3	3	100
Economic value	$41,981	$41,344	$13,915	$3,846	$10,762	$10,926	$122,773

[1] Others category includes freshwater drum, gar, goldfish, sucker, white bass, white perch

Table 5. -Mean catch per trap net lift for all species commonly taken during spring trap net surveys in Michigan waters of Lake Erie.

	Survey year											
Species	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Walleye	28.1	49.0	18.1	20.6	38.8	26.1	36.6	75.5	61.7	33.9	83.1	35.9
Smallmouth bass	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.3
Yellow perch	377.0	320.0	669.0	512.0	146.0	257.0	129.0	156.0	40.3	174.0	22.9	251.5
Rock bass	1.2	0.8	1.9	0.9	1.5	1.3	1.0	1.5	0.7	1.5	0.9	0.8
White bass	1.5	1.5	3.7	1.4	10.5	4.9	2.5	2.8	7.6	0.4	5.3	4.7
White perch	0.0	0.1	0.3	0.5	24.6	35.0	10.9	38.9	30.3	43.5	63.1	233.0
Pumpkinseed	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1
Bluegill	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Black crappie	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.2
Channel catfish	3.5	9.7	5.4	5.8	4.9	10.6	4.6	5.5	5.4	2.7	3.5	4.1
Brown bullhead	0.2	1.1	1.6	1.9	1.7	4.2	2.5	1.5	4.1	0.9	9.2	3.9
White sucker	7.8	8.3	7.9	12.2	8.7	6.7	10.2	33.0	10.2	7.0	6.7	2.8
Redhorse sp.	2.4	1.2	0.6	1.0	0.8	1.5	1.7	1.4	1.3	1.7	1.8	0.6
Freshwater drum	37.4	66.8	14.0	42.9	13.4	23.5	25.1	30.6	25.3	9.1	15.6	6.4
Common carp	5.1	26.1	4.7	8.2	6.9	14.9	3.5	2.0	1.9	0.6	6.0	0.6
Goldfish	4.8	2.4	0.3	0.4	0.4	2.5	0.6	0.2	0.1	0.0	0.2	0.1
Gizzard shad	4.4	4.7	2.3	3.9	17.8	28.4	18.1	17.4	2.7	2.3	15.9	0.3
Longnose gar	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Quillback	4.0	18.6	1.8	2.0	2.4	5.6	2.0	1.9	1.7	1.8	1.5	0.7
Stonecat	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Total	477.9	510.3	731.8	613.9	278.8	422.4	248.7	368.5	193.6	279.7	236.4	546.2
% yellow perch	78.9	62.7	91.4	83.4	52.4	60.8	51.9	42.3	20.8	62.2	9.7	46.0
% white perch	0.0	0.0	0.0	0.1	8.8	8.3	4.4	10.6	15.7	15.6	26.7	42.7
Net lifts	50	46	48	36	37	53	57	51	49	55	51	55

Table 5.–Continued.

Species	Survey year								78-89 mean	90-97 mean	Overall mean
	1990	1991	1992	1993	1994	1995[1]	1996	1997			
Walleye	23.8	95.9	37.7	39.2	53.0	26.2	52.0	30.2	42.3	44.8	43.3
Smallmouth bass	0.1	0.2	0.1	0.2	0.8	2.2	2.1	1.2	0.1	0.9	0.4
Yellow perch	41.7	94.6	35.0	50.2	23.2	10.3	36.6	30.7	254.6	40.1	168.8
Rock bass	0.3	0.8	0.5	1.2	1.0	4.1	1.1	0.9	1.2	1.2	1.2
White bass	0.9	1.6	0.5	0.1	1.1	2.1	0.6	2.6	3.9	1.2	2.8
White perch	40.5	56.8	5.1	0.0	14.7	72.8	5.9	10.2	40.0	25.7	34.3
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Bluegill	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Black crappie	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1
Channel catfish	9.0	6.0	4.6	4.6	5.4	3.7	8.8	4.4	5.5	5.8	5.6
Brown bullhead	13.1	4.3	4.0	1.6	1.1	0.2	1.1	0.4	2.7	3.2	2.9
White sucker	4.3	13.5	14.6	9.0	5.8	7.4	14.0	4.7	10.1	9.2	9.7
Redhorse sp.	0.4	0.6	3.1	3.6	1.8	1.0	5.5	1.9	1.3	2.2	1.7
Freshwater drum	5.1	25.6	8.9	20.7	8.8	13.0	15.4	6.8	25.8	13.0	20.7
Common carp	2.3	2.3	1.3	1.4	3.7	2.9	8.2	0.6	6.7	2.8	5.2
Goldfish	0.1	0.1	0.1	0.0	4.4	0.1	0.5	0.1	1.0	0.7	0.9
Gizzard shad	2.3	0.0	0.6	0.3	0.3	1.7	0.3	0.0	9.9	0.7	6.2
Longnose gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quillback	1.9	2.9	4.4	3.2	4.6	6.7	8.9	2.2	3.7	4.3	3.9
Stonecat	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	145.8	305.5	120.5	135.2	129.6	155.2	161.2	96.9	409.0	156.0	307.8
% yellow perch	28.6	31.0	29.0	37.1	17.9	6.2	22.7	31.7	55.2	25.5	43.3
% white perch	27.8	18.6	4.2	0.0	11.3	46.9	3.6	10.5	11.1	15.4	12.8
Net lifts	82	29	55	40	45	39	45	57	49	49	49

[1]Sampling period delayed two weeks.

Table 6.–Walleye CPUE (number per net lift) in multi-filament gill nets during fall surveys on Michigan waters of Lake Erie.

Year class	Total CPUE	Survey year 1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1972	1.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1973	1.0	0.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1974	13.6	0.3	1.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1975	42.8	3.5	2.0	0.5	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1976	18.4	2.8	1.0	1.5	0.3	0.0	0.5	–	–	–	–	–	–	–	–	–	–	–	–
1977	171.0	22.7	9.0	5.0	2.5	3.0	0.5	0.3	–	–	–	–	–	–	–	–	–	–	–
1978	61.6	25.0	6.0	5.5	2.5	1.8	0.5	1.3	–	–	–	–	–	–	–	–	–	–	–
1979	72.4	44.0	13.5	5.0	4.3	2.3	2.0	0.5	0.5	0.3	–	–	–	–	–	–	–	–	–
1980	92.7	–	43.0	21.5	14.5	5.0	5.3	2.3	0.5	0.3	0.0	0.3	–	–	–	–	–	–	–
1981	72.3	–	–	33.5	21.3	7.8	3.8	2.8	2.3	0.5	0.3	0.0	–	–	–	–	–	–	–
1982	306.2	–	–	–	29.0	91.8	95.8	44.3	28.5	5.3	7.5	3.5	0.5	–	–	–	–	–	–
1983	34.6	–	–	–	–	4.5	12.0	4.0	5.0	3.5	1.8	1.8	2.0	–	–	–	–	–	–
1984	147.7	–	–	–	–	–	69.8	34.3	20.5	3.5	8.0	8.3	2.0	0.5	0.3	0.5	–	–	–
1985	177.2	–	–	–	–	–	–	98.0	42.5	9.3	14.3	8.5	1.5	1.3	0.8	1.0	–	–	–
1986	297.5	–	–	–	–	–	–	–	96.8	30.3	90.3	43.5	19.5	11.0	3.8	2.0	0.3	–	–
1987	127.5	–	–	–	–	–	–	–	–	4.5	53.8	26.8	20.0	13.8	2.5	3.8	1.0	0.5	0.8
1988	125.0	–	–	–	–	–	–	–	–	–	61.5	35.8	9.3	7.3	4.5	4.5	0.5	0.8	0.8
1989	52.0	–	–	–	–	–	–	–	–	–	–	16.0	17.0	10.0	2.8	3.3	1.3	0.8	0.8
1990	136.1	–	–	–	–	–	–	–	–	–	–	–	54.5	48.0	13.0	16.5	1.5	1.3	1.3
1991	192.7	–	–	–	–	–	–	–	–	–	–	–	–	63.0	47.3	61.5	11.3	6.8	2.8
1992	13.1	–	–	–	–	–	–	–	–	–	–	–	–	–	2.0	7.3	2.0	0.3	1.5
1993	164.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	73.3	71.0	11.8	8.1
1994	120.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	63.3	43.0	14.0
1995	4.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.3	1.3
1996	37.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	37.5
Total		98.7	76.0	72.5	74.3	116.5	190.0	187.5	196.5	57.0	237.5	144.3	126.3	91.8	76.8	173.8	152.0	68.6	68.8
Net lifts		6	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4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